2018-19

QUALITY CONTROL TEST REPORT

Name of the Client: **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

Agency: **Sri. M. S. Venkatesh,** Contractor, Bangalore.

Name of the Work: Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.

PROJECT MANAGEMENT CONSULTANTS

M/s. CIVIL QUALITY CONSULTANTS & ENGINEERS

(Buildings Geo-Tech & Road Materials Testing Laboratory)
An ISO 9001: 2008 Certified Company

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JAS-ANZ
ISO 9001:2000 CERTIFIED

Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 25.12.2018

TEST REPORT

CLIENT	:	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
AGENCY	:	**Sri. M S Venkatesh,** Contractor, Bangalore.
NAME OF THE WORK	:	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
SAMPLE ID	:	Cement
SAMPLES SUPPLIED BY	:	AGENCY

The results of the tests conducted on the cement sample are as follows:

Sl.No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part -5)	140 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5)	400 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part 3) by the Le-Chatelier method	1 mm	Not more than 10 mm
3	Standard Consistency	IS-4031 (Part -4)	30.00 %	-

Note:

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For CIVIL QUALITY CONSULTANTS & ENGINEERS

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 25.12.2018

TEST REPORT ON FINE AGGREGATES (SAND)
IS 383-1970 (RA- 2002)

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency : **Sri. M S Venkatesh,** Contractor, Bangalore.
Name of Work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.

Date of Testing : 25.12.2018

Material : Sand Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits For Zone-II
10	0	0	0	100	100
4.75	83	8.30	8.30	91.7	90-100
2.36	152	15.20	23.50	76.5	75-100
1.18	173	17.30	40.80	59.2	55-90
600 Micron	341	34.10	74.90	25.1	35-59
300 Micron	157	15.70	90.60	9.4	8-30
150 Micron	78	7.80	98.40	1.6	0-10

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For CIVIL QUALITY CONSULTANTS & ENGINEERS

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 25.12.2018

TEST REPORT ON COARSE AGGREGATES
IS 383-1970 (RA- 2002)

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency : **Sri. M S Venkatesh,** Contractor, Bangalore.
Name of Work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Date of Testing : 25.12.2018
Material : 40mm Aggregates

Total Wt. of Aggregates in gms **15000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits
80	0	0	0	100	100
40	164	1.09	1.09	98.91	95-100
20	8324	55.49	56.59	43.41	30-70
10	3254	21.69	78.28	21.72	10-35
4.75	2643	17.62	95.90	4.10	0-5

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 25.12.2018

TEST REPORT ON COARSE AGGREGATES
IS 383-1970 (RA- 2002)

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency : **Sri. M S Venkatesh,** Contractor, Bangalore.
Name of Work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.

Date of Testing : 25.12.2018

Material : 20mm Aggregates

Total Wt. of Aggregates in gms= **5000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits
40	0	0	0	100	100
20	134	2.7	2.7	97.3	95-100
10	2453	49.1	51.7	48.3	25-55
4.75	2013	40.3	92.0	8.0	0-10

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 DATE : 28.12.2018

TEST REPORT ON SOLID CONCRETE BLOCKS

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

Agency : **Sri. M S Venkatesh,** Contractor, Bangalore.

Name of the Work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.

Date of Testing : 28.12.2018

Size of Blocks : 400mm x 200mm x 200mm

Cross Sectional Area : 40000 mm^2

Technical Reference : IS: 2185 (Part 1) - 2005

No. of Blocks Tested : 04

Sl.No.	Block ID	Wt. in Kg	Failure load (KN)	Compressive strength (N/mm^2)	Requirement as per IS 2185 (Part 1) - 2005
1	Block 1	28.8	287.9	3.60	Minimum required Compressive Strength of Individual Units 3.50 N/mm^2
2	Block 2	26.4	294.3	3.68	
3	Block 3	29.1	289.7	3.62	
4	Block 4	25.3	292.4	3.66	

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 27.01.2019

TEST REPORT ON CEMENT MORTAR CUBES

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Contractor : **Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Sample ID : Cement Mortar
Size of cubes : 50mmx50mmx50mm
Cross Sectional Area : 2500 mm^2
Technical Reference : IS: 516-1959 (Reaffirmed 2008)
Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	30.12.2018	27.01.2019	0.782	12.8	5.12
2	30.12.2018	27.01.2019	0.764	13.4	5.36
3	30.12.2018	27.01.2019	0.792	13.8	5.52

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 10.01.2019

TEST REPORT ON CONCRETE CUBES

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Contractor : **Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Sample ID : Cement Concrete
Size of cubes : 150mmx150mmx150mm
Cross Sectional Area : 22500 mm^2
Technical Reference : IS: 516-1959 (Reaffirmed 2008)
Grade of Concrete : M_{15}
Compressive Strength as on : 7th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	03.01.2019	10.01.2019	8.133	287.3	12.77
2	03.01.2019	10.01.2019	8.127	276.2	12.28
3	03.01.2019	10.01.2019	8.146	254.8	11.32

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 31.01.2019

TEST REPORT ON CONCRETE CUBES

Client	: **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Contractor	: **Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the work	: Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Sample ID	: Cement Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
Grade of Concrete	: M_{15}
Compressive Strength as on	: 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	03.01.2019	31.01.2019	8.182	416.3	18.50
2	03.01.2019	31.01.2019	8.176	394.2	17.52
3	03.01.2019	31.01.2019	8.164	384.5	17.09

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 10.01.2019

TEST REPORT ON CONCRETE CUBES

Client	: **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Contractor	: **Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the work	: Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Sample ID	: Cement Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
Grade of Concrete	: M_{15}
Compressive Strength as on	: 7th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	03.01.2019	10.01.2019	8.127	259.3	11.52
2	03.01.2019	10.01.2019	8.136	278.2	12.36
3	03.01.2019	10.01.2019	8.127	263.5	11.71

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 31.01.2019

TEST REPORT ON CONCRETE CUBES

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Contractor : **Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Sample ID : Cement Concrete
Size of cubes : 150mmx150mmx150mm
Cross Sectional Area : 22500 mm^2
Technical Reference : IS: 516-1959 (Reaffirmed 2008)
Grade of Concrete : M_{15}
Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	03.01.2019	31.01.2019	8.176	396.5	17.62
2	03.01.2019	31.01.2019	8.189	385.2	17.12
3	03.01.2019	31.01.2019	8.167	405.2	18.01

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 05.01.2019

KERB STONE (CORE) TEST REPORT

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

Agency : **Sri. M S Venkatesh,** Contractor, Bangalore.

Name of Work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.

No.of Sample Tested : 03

Date of Testing : 05.01.2019

Techinical Reference : IS:516-1959 (Reaffirmed 1999), SP-24:1983.

Grade of Concrete : M_{15}

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	71.00	0.325	2331.28	1.42	0.960	28.40	14.46	15.62	15.00	18.75
2	50.00	73.00	0.336	2344.16	1.46	0.960	27.30	13.90	15.02	14.42	18.02
3	50.00	75.00	0.349	2369.92	1.50	0.960	26.40	13.45	14.52	13.94	17.43

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 10.02.2019

PRECAST SLAB 100mm Thick(CORE) TEST REPORT

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

Contractor : **Sri. M S Venkatesh,** Contractor, Bangalore.

Name of Work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.

No.of Sample Tested : 03

Date of Testing : 10.02.2019

Techinical Reference : IS:516-1959 (Reaffirmed 1999), SP-24:1983.

Grade of Concrete : M_{20}

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	82.00	0.358	2223.51	1.64	0.960	34.20	17.42	18.81	18.06	22.57
2	50.00	84.00	0.383	2322.15	1.68	0.960	35.10	17.88	19.31	18.53	23.17
3	50.00	86.00	0.399	2362.90	1.72	0.960	36.20	18.44	19.91	19.11	23.89

Note:

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JobNo: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 12.01.2019

GRADATION FOR GSB (Close Graded)
IS : 2720 (Part - 4)

Agency : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Client : **Sri. M S Venkatesh,** Contractor, Bangalore.
Name of work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Date of Testing : 12.01.2019

Oven Dry Wt (gm) : 13329

TABLE – 1

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Specified Limits
53	-	-	-	100	100
26.5	1824	1824	13.68	86.32	70-100
9.5	2326	4150	31.14	68.86	50-80
4.75	2136	6286	47.16	52.84	40-65
2.36	1874	8160	61.22	38.78	30-50
0.425	2143	10303	77.30	22.70	15-25
0.075	2242	12545	94.12	5.88	3-10
PAN	784				
Total	13329				

TABLE – 2: Tests on filler screen materials (As per Table : 400-13)

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	23.50	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

Remarks: Satisfies MORTH Specifications as per Table 400-2, Grading II

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 14.01.2019

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

Agency : **Sri. M S Venkatesh,** Contractor, Bangalore.

Name of Work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.

Date of Testing : 14.01.2019

Material Type : Wet Mix Macadam

Oven Dry.Wt 10500

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	342	342	3.3	96.7	95-100
22.4	3265	3607	34.4	65.6	60-80
11.2	1975	5582	53.2	46.8	40-60
4.75	1543	7125	67.9	32.1	25-40
2.36	1043	8168	77.8	22.2	15-30
0.600	765	8933	85.1	14.9	8-22
0.075	752	9685	92.2	7.8	0-8

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 **Date:** 14.01.2019

Aggregate Impact Value
IS: 2386 Part IV

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the Work	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Type of Mix	Wet Mix macadam
Date of Testing	14.01.2019

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	382	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	81	83	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	297	299	295	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.43	21.73	22.37	21.84

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 14.01.2019

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of Work	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Sample ID	WMM Layer
Date of Testing	14.01.2019

Result : Flakiness Index = **12.16%**

Elongation Index = **13.26%**

Result : Combined Flakiness & Elongation index **25.42%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 14.01.2019

ATTERBERG LIMITS TEST FOR WMM
MORTH TABLE-400-11

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

Agency : **Sri. M S Venkatesh,** Contractor, Bangalore.

Name of Work : Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.

Date of Testing : 14.01.2019

Material Type : Wet Mix Macadam

As per MORTH Table 400-13

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit	23.00	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 19.01.2019

TEST REPORT

Client	:	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	:	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the work	:	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Date of testing	:	19.01.2019

The results of the tests conducted on the bitumen sample using for Bituminous Macadam

Sl. No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	64	60 to 70
2	Softening point, ^{0}C	49	Min. 45
3	Ductility at 27^{0}C, cm	100 >	Min. 50
4	Flash Point, ^{0}C	287	Min. 220

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 19.01.2019

Aggregate Impact Value

IS: 2386 Part IV

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the Work	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Bituminous Macadam
Date of Testing	19.01.2019

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	380	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83	85	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	295	295	299	
4	Aggregate Impact value = percent fines	21.96	22.37	22.54	
	100* (W_2/W_1)%				22.29

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Macadam is 30%

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 19.01.2019

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of Work	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Macadam
Date of Testing	19.01.2019

Result : Flakiness Index = **13.24%**

Elongation Index = **14.38%**

Result : Combined Flakiness & Elongation index **27.62%**

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 19.01.2019

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the Work	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Source / Location	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	19.01.2019

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2023	2020	
2	Weight of basket suspended in water	W_2 g	754	754	754	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1267	1269	1266	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2017	2018	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	755	755	755	
6	Weight of oven dried aggregate	W_4 g	2009	2010	2011	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.682	2.687	2.674	2.678
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.708	2.713	2.699	2.703
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.35%	0.35%	0.35%	0.35%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Macadam is 2.0%

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Aggregate Gradation Test
IS : 2386 Part I

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the work	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Sample ID	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	20.01.2019

5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	234	4.68	4.68	95.32	90-100	
13.2	1784	35.68	40.36	59.64	56-88	
4.75	1642	32.84	73.20	26.80	16-36	
2.36	723	14.46	87.66	12.34	4-19	
0.3	342	6.84	94.50	5.50	2-10	
0.075	86	1.72	96.22	3.78	0-8	

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	359	7.18	7.18	92.82	90-100	
13.2	1427	28.54	35.72	64.28	56-88	
4.75	1625	32.50	68.22	31.78	16-36	
2.36	647	12.94	81.16	18.84	4-19	
0.3	512	10.24	91.40	8.60	2-10	
0.075	64	1.28	92.68	7.32	0-8	

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 20.01.2019

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS MACADAM MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
AGENCY	**Sri. M S Venkatesh,** Contractor, Bangalore.
NAME OF THE WORK	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
SAMPLE I/D	Sample Supplied by Agency
DATE OF TESTING	20.01.2019

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	482	482.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	18	17.50
7. Bitumen content in %	3.60	3.50
8. Average	3.55	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
26.5	0	0	0	100	100
19	41.2	8.55	8.55	91.45	90-100
13.2	142.3	29.52	38.07	61.93	56-88
4.75	168	34.85	72.93	27.07	16-36
2.36	54.3	11.27	84.19	15.81	4-19
0.3	34.2	7.10	91.29	8.71	2-10
0.075	8.7	1.80	93.09	6.91	0-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
26.5	0	0	0	100	100
19	34.2	6.84	6.84	93.16	90-100
13.2	152.4	30.48	37.32	62.68	56-88
4.75	176.8	35.36	72.68	27.32	16-36
2.36	73.2	14.64	87.32	12.68	4-19
0.3	32.4	6.48	93.80	6.20	2-10
0.075	8.7	1.74	95.54	4.46	0-8

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 27.01.2019

TEST REPORT

Client	:	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	:	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the work	:	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Date of testing	:	27.01.2019

The results of the tests conducted on the bitumen sample using for Bituminous Concrete

Sl. No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	64	60 to 70
2	Softening point, ^{0}C	52	Min. 45
3	Ductility at 27^{0}C, cm	100 >	Min. 50
4	Flash Point, ^{0}C	296	Min. 220

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 27.01.2019

Aggregate Impact Value

IS: 2386 Part IV

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the Work	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	27.01.2019

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.34	22.74	22.54

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

Note:

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 27.01.2019

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of Work	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Bituminous Concrete
Date of Testing	27.01.2019

Result : Flakiness Index = **11.24%**

Elongation Index = **14.37%**

Result : Combined Flakiness & Elongation index **25.61%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 27.01.2019

Specific Gravity And Water Absorption Test
IS: 2386 Part III

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the Work	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Type of Mix	Bituminous Concrete
Date of Testing	27.01.2019

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2022	2020	2023	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1267	1265	1268	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2016	2017	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	748	751	749	
6	Weight of oven dried aggregate	W_4 g	2008	2009	2011	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.684	2.675	2.685	2.682
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.710	2.700	2.707	2.706
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.35%	0.35%	0.30%	0.33%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 28.01.2019

Aggregate Gradation Test

IS : 2386 Part I

Client	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of theWork	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	28.01.2019

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	524	10.48	10.48	89.52	79 - 100	
9.5	473	9.46	19.94	80.06	70 - 88	
4.75	752	15.04	34.98	65.02	53 - 71	
2.36	534	10.68	45.66	54.34	42 - 58	
1.18	429	8.58	54.24	45.76	34 - 48	
0.600	665	13.30	67.54	32.46	26 - 38	
0.300	532	10.64	78.18	21.82	18 - 28	
0.150	327	6.54	84.72	15.28	12 - 20	
0.075	419	8.38	93.10	6.90	4 - 10	

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	607	12.14	12.14	87.86	79 - 100	
9.5	483	9.66	21.80	78.20	70 - 88	
4.75	724	14.48	36.28	63.72	53 - 71	
2.36	557	11.14	47.42	52.58	42 - 58	
1.18	527	10.54	57.96	42.04	34 - 48	
0.600	678	13.56	71.52	28.48	26 - 38	
0.300	429	8.58	80.10	19.90	18 - 28	
0.150	247	4.94	85.04	14.96	12 - 20	
0.075	327	6.54	91.58	8.42	4 - 10	

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 28.01.2019

TEST REPORT ON STABILITY OF MIX

Client	:	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	:	**Sri. M S Venkatesh,** Contractor, Bangalore.
Name of the Work	:	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	28.01.2019

The results of the tests conducted on the bituminous concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	10.67	9.25	9 Kn (min)
2	Marshal flow, mm	3.34	2.37	2 – 4
3	Percent air voids in Mineral Aggregate	14.82	13.83	13 – 15
4	Voids in Compacted Mix	5.19	4.47	3 – 6
5	Percent Voids filled with Bitumen	73.37	72.32	65 - 75
6	Density, g/cc	2.27	2.26	--

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 28.01.2019

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

CLIENT	**Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
AGENCY	**Sri. M S Venkatesh,** Contractor, Bangalore.
NAME OF THE WORK	Improvements & asphalting roads at Manjunatha Nagara Tenginathot, Byraveshwaranagara, Sampangi Ramaiah Layout, main roads & cross roads of M.E.I Layout left Side, & Bagalagunte in Bagalagunte in Ward No:14 (5-Works) Package No. DZ 2017-18-(03), BBMP, Bangalore.
DATE OF TESTING	28.01.2019

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	469	470
3. Weight of Asphalt and Mineral matter Extracted, g	31	30
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	31	30
7. Bitumen content in %	6.20	6.00
8. Average	6.10	

GRADATION AFTER EXTRACTION

TABLE - 1

SIEVE SIZE	Percent Passing, %		JOBMIX
mm	Sample 1	Sample 2	Gradation
19	100.0	100.0	100
13.2	94.2	96.1	79-100
9.5	70.3	72.3	70-88
4.75	54.6	56.7	53-71
2.36	44.6	46.8	42-58
1.18	36.5	38.2	34-48
0.6	28.9	30.5	26-38
0.3	20.4	22.6	18-28
0.15	13.4	14.6	12-20
0.075	5.5	6.5	4-10

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